

the air bubble observed with a lens is seen to be in continual oscillation; but simplicity, portability, and some other desirable properties, seem to be sacrificed for the sake of sensitiveness in this instrument; although, on the other hand, it should be added that if for the first time the principles involved in the aneroid form of barometer were presented to the mind, the carrying them into practice for constructing a truly serviceable barometer would seem almost beyond hope; while experience has taught us that this form of barometer, even as small as a lady's Geneva watch, can be produced at relatively small cost with certainty and in endless quantity; and that the aneroid barometer is assisting in a large amount of valuable climatic and hypsometrical observation.

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ART. IX.—*On some New Marine Mollusca.*

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Roy. Soc. N.S.W., Corr. Memb. Roy. Soc. Victoria,  
Tasmania, and Phil. Soc., Linn. Soc. N.S.W., &c.

[Read 9th August, 1877.]

THE following shells were placed at my disposal for description by Prof. M'Coy, of the National Museum of Victoria. I had been engaged for some time previously, preparing a census of the Tasmanian marine molluscan fauna, and on completing my lists and making the necessary comparisons at the National Museum I came across several in the extensive collections there which appeared to be new and undescribed. Permission to describe them was very cheerfully accorded by the learned Professor, whose obliging courtesy to me on all occasions where he could forward my small efforts in the interests of science I take this opportunity thankfully to acknowledge. It will be seen that the fauna here described is not in any way divergent from the recognised forms. A *Birostra* is, however, quite a novelty in Australian seas. Amongst all the species there is not one which even approximates to the extinct fauna of our tertiary beds, except in the case of the *Limopsis* just mentioned. N.B.—All measurements in French millimetres.

BIROSTRA M'COYI, n.s. *B. t.*, *parva, lævi, nitente, anguste ovata, utrimque attenuata, superne subacuta, pallide rufescente, labio albida pallide lutea, conspicue incrassato, postice dilatato, canali brevi, tenuiter curvato.* Long. 23, Lat. 7 mil. Hab. Waterhouse, N.E. Tasmania.

Shell small, smooth, shining, narrowly ovate, alternate at each end, subacute above, pale reddish; lips whitish and pale yellow, conspicuously thickened, dilate posteriorly, canal short and slightly curved.

The only species of this rare genus found hitherto in South Australian waters. The type specimen in the National Museum is unique.

OLIVELLA AUSTRALIS, n.s., *O. t.*, *turrita, fusiformi, spira elata apertur. æquantì, lævi, nitente, alba, pallide fulva reticulata et fasciis tribus albis zonata; sutura vix impressa; apertura angusta, antice dilatata, labro tenui acuto, columella simplici.* Long. 16, Lat. 4½ mil. Clark's Island.

Shell turreted, fusiform, spire produced and equalling the aperture; smooth, shining, white, reticulated with fulvous brown, and zoned with three white bands; suture scarcely impressed; aperture narrow, anteriorly dilated; outer lip thin acute, columella simple.

Differs from *O. nympha* in being coloured, and from *O. pardalis* and *O. leucozona* in its pale reticulated chesnut markings and three white zones. Its shape is also peculiar. I do not think enough is known about the genus to say whether it is liable to variation or not, and whether the species named are all only varieties. They are all rare, and therefore, one would imagine, less liable to vary.

MANGELIA HARRISONI, n.s. *M. t.*, *anguste fusiformi, utrimque attenuata, lævi, gracili, tenui, translucida, spira elata, acuta, apert. æquantì, lactea, basi castanea, apice vero fulvo tincto, pallidissime (ult. anfr. tant.) luteo 4 zonata; anfr. 8, declivis, oblique costatis, costis lævibus, rotundatis, parum elevatis, superne obtuse angulatis, antice obsoletis; sutura bene impressa; apertura angusta, oblonga, labro tenui, labio reflexo.* Long. 14, Lat. 4. Clark's Island.

Shell narrowly fusiform, attenuate at both ends; smooth, graceful, thin, translucent; spire prominent, acute, equalling the aperture, milky white; base chesnut, but the apex stained, fulvous, and on the last whorl zoned with four bands of very pale yellow; whorls eight, sloping, obliquely ribbed;

ribs smooth, rounded, slightly raised, obtusely angular above, obsolete anteriorly; suture well impressed, aperture narrow, oblong; outer lip thin, inner lip reflected. Very rare.

Differs from *M. compta* of N.S.W. in the ribs being closer, and the absence of spiral striæ. The general form is also different.

MANGELIA TRACHYS, *n.s.* *M. t. parva, fusiforme turrata, opaca, solida, alba, maculis fulvis conspicue nebulosa; anfr. 7 (2 apical. levibus, albis, obtusis) crebre crassicostatis et conspicue liratis; liris supra costas transeuntibus, et ibi nodosis, costis in ult. anfr. 9; sutura bene impressa, unilirata; apertura oblonga, subquadrata, labro conspicue incrassato, postice profunde sinuato, sinu obliquo, columella simplici, canali brevi.* Long. 6, Lat. 2. Brighton.

M. shell small, fusiformly turreted, opaque, solid, white, conspicuously clouded with fulvous spots; whorls seven (the two apical smooth, white, obtuse), abundantly costate with thick ribs and very conspicuously lirate; the liræ passing over the ribs and there nodose; ribs in the last whorl nine; suture well impressed, with one fine raised line: aperture oblong, subquadrate, outer lip conspicuously thickened, deeply sinuous posteriorly; sinus oblique, columella simple, canal short.

The sinus, instead of going back into the shell, is confined to the thickened lip, and is oblique to the aperture.

RISSOINA KERSHAWI, *n.s.* *R. t. minuta, pupæformi, subcylindracea, fulvo saturata; anfr. 6, tumide convexis oblique crebre costatis, apice obtuso, apertura subcentrali, orbiculata, labio reflexo.* Long. 3, Lat. *vix.* 1½. Long Bay, Tasmania. W. F. Petterd.

Shell minute pupæform, subcylindrical, saturated fulvous brown, whorls 6, tumidly convex, obliquely closely ribbed; apex obtuse, aperture subcentral, orbicular, lip reflexed,

The aperture, which is almost central under the axis, and the uniform brown colour, distinguish this species.

RISSOINA SUPRASCULPTA, *n.s.* *R. t. minuta, pyramidata, alba, opaca, apice mammilato et verticaliter sito; anfr. (vertice excluso) 6, ultimo et penult. rotundato 3-striato, reliquis granulatis, basim versus marginatis, supra suturas canaliculatis (canalic. transverse striata), apertura pyriformi, labio tenui, reflexo.* Long. 4, Lat. 1½. Long Bay, Tasmania.

Shell minute, pyramidal, white, opaque, apex mammilated

and placed vertically; whorls 6, exclusive of the vortex, last and last but one rounded and tri-striate, the rest granulose, margined towards the base and canaliculate above (this channel transversely striate); aperture pyriform, lip thin reflexed.

*BITTIUM SEMILÆVIS*, n.s. *B. t. minuta, turrata, castanea*; conspicue eleganterque carinis et costulis clathrata; anf. 12, quinque apicalibus lævibus, nitentibus, basi læva. labro tenui. Long. 5, Lat. 1. N.W. Tasmania.

Shell minute, turreted, pale chesnut, conspicuously and elegantly latticed with keels and ribs; whorls 12, the apical 5 smooth, shining base, smooth lip, thin.

The smooth apical whorls are peculiar, and perhaps this portion is decollated with age. The only specimen known to me is in the Melbourne National Museum. Possibly it would come under some of Mr. Adams' genera near to *Cingulina*.

*LIOTIA MINIMA*, n.s. *L. t. minuta, orbiculari, spira parum exserta, alba, pellucida, spiraliter striata, apertura valde incrassata, umbilico granis nitentibus marginatis*.

This very minute *Liotia* seems devoid of ornament, except the regular spiral groove. It has, however, a remarkably thickened varix round the aperture, and a granularly margined umbilicus; in all which respects it differs from any species known to me.

*THALOTIA MARIÆ*, n.s. *T. conica simillimi sed paulo parviore, carinulis haud granulosis, striis inter carinulis latis, rotundatis, luteis; lineis albis longitudinalibus, angulariter undulosis et maculis roseis, et flammulis roseo purpureis, vel atro-purpureis variegata; apertura subquadrata, intus argentea, lirato, columella haud dentata*. Long. 17, Lat. 12.

Differing from *T. conica*, Gray (with which shell it has been hitherto confounded) in not being granular, though the peculiar spotted colouring makes it appear so. It is almost regularly tessellate on the upper part of the whorls. It is more tumid, solid, and darker in colour than *T. picta*, Wood, and *T. pulchella*. Not uncommon in Hobson's Bay, though much more numerous outside Port Phillip Heads. I have never known it to occur in Western Victoria or Tasmania.

*THALOTIA TESSELLATA*, n.s. *T. t. parva, subumbilicata conica, pallide olivacea, alba maculata vel tessellata*; anfr. 7, sub-

convexis, ubique subtilissime spiraliter et oblique transversim striatis; 5 carinis munitis; carinis latis, planatis, supra et infra latioribus et prominentioribus, basi convexa, carinata; apertura subquadrata; labro acuto tenui, intus marginato, labio albo, conspicuo, fauce argentea, margaritacea, lirata. Alt. 6., Lat.  $4\frac{1}{2}$ . Interstitiis inter carinas interdum liratis.

Shell small subumbilicate, conical, pale olive, spotted or tessellated with white; whorls 7, subconvex, everywhere finely obliquely, spirally transversely striate; furnished with five keels, which are broad, flattened, and the upper and lower ones broader and more prominent; base convex, keeled, aperture subquadrate, outer lip acute thin, margined within; inner lip white, conspicuous; throat silvery nacreous, lirate. The interstices between the keels sometimes striate.

THALOTIA DUBIA, n.s. *T. t. turbinato-conoidea, solida intense roseo purpurea et roseo-flammulata; anfr. 7, convexis (4 apicalibus planatis), carinis 4, parvis, distantibus conspicue granulatis, instructis; granulis parvis, concinnis, roseo-purpureis; interstitiis granulose liratis, periostraca lutea sericea indutis; sutura profunda, late subcanaliculata, basi planata, spiraliter lirata et radiatim striata; apertura subquadrata, incrassata, conspicue multidentata; columella tuberculata marginata et crebre dentata.* Long. 18, Lat. 15. Clark's Islands.

Shell turbinately conical, solid whorls intensely rose-purple and rose-flamed, whorls 7, convex (the four spiral flattened), keels 4, small, distant, conspicuously granular; granules small, neat, and rose purple in colour; interstices clothed with a yellow silky periostraca; suture deep, broadly subcanaliculate; base flattened, spirally lirate and radiately striate, aperture subquadrate, thickened conspicuously multidentate; columella tuberculate, margined and closely toothed.

In general form resembling *T. conica*, but smaller and more closely ornamented. The mouth is also an approach to a *clanculus*. Rare.

MINOLIA VECTILIGINEA (Menke), var? *M. t. orbiculata, depressa, tenui, diaphana, profunde, perspective umbilicata; anfr.  $5\frac{1}{2}$  rapide decrescentibus rotundatis, ad peripheriam obtuse angulatis, undique spiraliter crebre tenuissime striatis et subtilissime transversim oblique striatis, umbilico albo, concavo, ad marginem angulato, apertura rotundata.* Eleganter atro et olivo marmorata, ad peripher. olivo et albo

*tesselata, vel in lineis longit. dispositis strigata. Maj. diam. 11, min. 9, Alt 8. Hobson's Bay.*

Shell orbiculate, depressed, thin, diaphanous, deeply and perspectively umbilicate; whorls  $5\frac{1}{2}$ , rapidly decreasing, rounded, obtusely angular at the periphery, thinly and very finely striate all over with transverse and oblique spiral striæ. Umbilicus white, concave, angular at the margin, aperture rounded. Elegantly marbled black and olive, tessellated at the periphery with white, or sometimes striped in lines. Common.

This shell is much varied in the markings, and in its young state is often rose, or brown, or orange in colour. It is of course no more than a variety of the variable *Minolia vectiliginea*, but I give my own diagnosis as Menke's list is difficult to meet with, and, as I think, hardly sufficient.

TAPES VICTORIÆ, *T. t. inæquilaterali, oblongo-ovata, sub-tumida, antice abbreviata, rotundata, postice sub-lata, elevata rotundata, et concentrice crebre costata; costis rotundatis sub-elevatis, inæqualibus, in medio sæpe desinentibus; umbonibus parvis, antice sub-arcuatis; ligamento lanceolato conspicuo; dentibus cardinalibus valv. dext. 2, valv. sinis. 2 anteriorib. bifidis; pallide carnea, lineis fulvis divergentibus, litterata ad margines punctis intensioribus maculata; pagina interna lutea antice et postico fulve purpureo tincta.* Lat. —, Long. —, Alt. —. Hobson's Bay.

Shell inequilateral, oblong, oval, subtumid, shortened anteriorly, rounded posteriorly, somewhat wider, raised, rounded, and concentrically thickly ribbed; ribs rounded, sub-elevate unequal, often disappearing in the middle; umbones small, slightly curved anteriorly, ligament lanceolate and conspicuous; hinge teeth, two in right valve and two in the left, which are bifid, colour pale flesh, with brown divergent letterlike lines, which are more intense towards the margins; inner surface yellow, stained at each end a purple brown.

CIRCE PYTHINOIDES, *n.s. C. t. parva, crassa, suborbiculata, vix gibbosa, parum, quadrata, albida, postice atro-purpurea maculata, radiatim costata, costis irregularibus, rude nodose granulatis ad marginem sæpe divisis, antice et postice divaricatim, bifurcatim plicatis, umbonibus acutis, vix curvatis, lunula late ovata, purpurea, marginibus incrassatis, valde flexuosis, pagina interna nivea, dentibus crassis, conspicuis.* Long. 25, Lat. 22, Alt. 10. Victoria.

Shell small, thick, sub-orbiculate, scarcely gibbous, slightly quadrate, whitish, spotted black purple posteriorly; radiately ribbed, ribs irregular, coarsely nodosely granular; ribs often divided towards the margin, anteriorly and posteriorly divaricately and bifurcately plicate; umbones acute, slightly curved; lunule widely ovate, purple; margins thickened, very flexuous, interior snowy white; teeth thick, conspicuous.

There is a *Circe* something like this figured in Reeve (*Icon. V., fig. 21*) and identified with *C. gibba* occurring in the Red Sea and Philippines. It may be the species here described, but it is quite distinct from *C. gibba*. The differences from both figures and descriptions are as follow:— It is smaller, almost orbicular, has a series of divaricating ribs sloping away on *both* sides at an acute angle from the first and last central ribs, giving rise to a sculpture like the genus *Pythina*.

ARCA M'COYI, *n.s. A. t. alba, periostraca fusca plus minusve induta, oblonga, quadrata, medio sinuata et hiante, postice latiore et carinata, confertissime concentricè granulose costata; granulis subspinosis, rotundatis, obtusis, supr. carin. longioribus et radiatim dispositis; umbonibus parvis, acutis, planatis, curvatis, area angusta, postice attenuato; dentibus parvis linea curvata dispositis; marginibus denticulatis, pagina, interna, nitente, nivea.* Long. 7, Lat. 14, Alt. 6. Var ex, N. S. Wales, *tumidioribus*.

Shell white, more or less covered with a dusky periostraca, oblong, quadrate, sinuate and gaping in the centre, broader and keeled posteriorly, very closely concentrically granulously ribbed; granules sub-spinous, rounded, obtuse, longer upon the keel and radiately disposed, umbones small, acute, flattened at the sides and curved; area narrow, attenuate posteriorly; teeth small and disposed in a curved line, margins denticulate; internal surface white and shining.

This shell is so near *Arca gradata* (Brod. of West Columbia) that I doubt if it be distinct. The species have a wide distribution. The E. Indian *A. imbricata*, Brug., and the West Indian *A. trapezia*, are common in Australia.

PECTUNCULUS FLABELLATUS, *n.s. P. t. late orbiculari, paulo vero transversa, crassa, tumidiuscula, radiatim valide costata; costis 25—35, latis, planatis, ætate antice et postice confertis; marginibus late denticulatis; dentibus card. 16—20, crassis; alba, intense fulva intus tincta et*

*extus plus minusve nebulosa et maculata.* Long. 44, Lat. 47, Alt. 44.

Shell broadly orbicular, but slightly transverse, thick, somewhat tumid, validly radiately ribbed; ribs 25 to 35, broad, flattened, becoming very close at the sides as the shell grows; margins broadly toothed; cardinal teeth 16 to 20, white; colour white stained, but intense fulvous brown within, and more or less clouded and spotted with the same colour on the outside. Victoria and Tasmania. Not common. Resembling *P. radians*, Lam., but differing in the particulars italicised above. It seems also to be almost without periostraca. Very near *P. laticostatus*, Lam., which Prof. Tate informs me is found at Spencer's Gulf and N. Tasmania. It may turn out not to be specifically distinct from that shell which is so abundant in our Miocene Tertiaries.

TRUNCATELLA MICRA, n.s. *T. t. minuta, alba, translucida, cylindræa; anf. 4 (decollatis) irregulariter costato-striatis, inflato-convexis; sutura impressa, apertura parva, semilunari, labro reflexo.* Long. 4½, Lat. 1½. Brighton, Victoria.

Shell minute, white, translucent, cylindrical; whorls 4, (decollate) irregularly costately striate, inflatedly convex; suture impressed, aperture small, semilunar, outer lip reflexed.

There are so many *Truncatellæ* described, which run so closely to each other, that I hesitate to add this species. It seems, however, to differ widely enough from all known to me to warrant my giving it a name. It was found by Mr. Kershaw.

The following freshwater shells were placed in my hands for the most part by Mr. W. Kershaw, the intelligent taxidermist and collector for the National Museum. It will be seen that I describe as new species several ciliated *Physæ*, which I regard as being very close to those already described by me as from Tasmania. Freshwater shells, it must be remembered, have always a very wide range, being carried about by aquatic birds in their migrations. Thus I have found many freshwater and fluviatile species common to North-east Australia and New Caledonia. Yet strange to say there is sometimes a great difference found in the species inhabiting freshwater lakes or streams within a short distance. The species common to Tasmania and Victoria are pretty numerous, and more may yet be found. *Bythinia Huonensis*, nobis (which Professor Tate considers should be

made the type of a new genus) is common about Melbourne. *Physa Dulvertonensis*, Reeve, I have also seen, but no traces so far of the peculiar and large *Ancylus*. If the ciliated large *Physa* here described are all varieties of *P. ciliata nobis*, the shell must be very variable; and all those of Victoria have a marked uniform character; it is very possible that some of them may have been described before, though after a diligent search I have not been able to discover where. Meanwhile it is very desirable that the species should have names and descriptions easily accessible to Australian naturalists, which I have accordingly given them in the descriptions which follow:—

*PHYSA PILOSA*, n.s. *P. t. subumbilicata, tenui, nitente, inflato, oblique, late ovata, lactea vel fulva, spira, fulva, subpellucida; anfr. 3, ultimo inflato et obliquo, 2 apicalibus parvis, acutis; regulariter longitudinaliter striatis, periostraca lutea, indutis, lineis regularibus pilosis vel punctatis instructa, sutura coronata, apertura oblique ovata, antice producta; labro tenui, labio reflexo.* Lat. 6, Long. 11, 1.11 mil.

This may possibly be only a variety of *P. crebreciliata*. It differs from it in being thinner, lighter in colour, with a very thin periostraca—the extremely small spire, with the oblique and interiorly produced aperture.

*PHYSA CREBRECILIATA*, n.s. *P. t. umbilicata, tenui, inflata; late ovata, cornea, fusca vel albida et diaphana; periostraca totaliter induta; anfr. 3½, duobus apicalibus parvis, penultimo perobliquo, longitudinaliter crebre striatis, et spiraliter lineis ciliatis crebre instructis, suturis periostraca coronatis, apertura late ovata, tenuiter incrassata vel bilabiata, labio conspicue reflexo.* Long. 7, Lat. 15 mil. Caulfield, Melbourne.

Shell umbilicate, thin, inflated, broadly ovate, horny, dusky or whitish and diaphanous, completely covered with a ciliated periostraca; whorls 3½, the two apical ones small, the penultimate peroblique, thickly striate lengthwise, and furnished with close spiral ciliated lines; sutures crowned by the periostraca, aperture broadly ovate, slightly thickened or bilabiate, lips conspicuously reflexed.

The cilia in this shell are in regular equi-distant spiral lines, and at the sutures the periostraca seems to mass itself in small rough folds, so as to make a spinous ridge.

*PHYSA ARACHNOIDEA*, n.s. *P. t. elongata ovata vel subcylind-*

*dracea, crassiuscula, opaca, nitente, vel periostraca induta. obscure fulva, vel lutea et alba maculata, apice acuto; anfr. 6, rapide decrescentibus, leviter convexis et declivis longit. et transvers. striatis; striis granulato-punctato (sub lente tantum visis) punctis lineis spiralibus dispositis; apertura, obliqua, pyriforme, antice producta, intus cretacea; plica crassa, per umbilicum tantum visa. Long. 12, Lat. 5½. Long. apert. 7, Lat. 3½. Mordialloc, Victoria. W. Kershaw.*

Shell elongately ovate or sub-cylindrical, rather solid opaque, shining or clothed with a periostraca; shell brown or yellow, with white spots, apex acute; whorls 6, rapidly decreasing, slightly convex and sloping; striate lengthwise and transversely, striæ granularly dotted, which is only visible under the lens, dots disposed in spiral lines; aperture oblique, pyriform, produced anteriorly, chalky white inside; plait thick, but visible only by looking, as it were, upwards through the umbilicus.

I believe that the points or dotted spiral lines are derived from cilia, which, however, had disappeared from all the specimens examined by me. They would surely be found in younger specimens. Perhaps, after all, this is only a variety of the *Physa Dulvertonensis* of Tasmania.

*PHYSA YARRAENSIS, n.s. P. t. sub-umbilicata tenui diaphana pallide cornea, nitente, spira acuta; anfr. 4, convexis, declivis, 2 apicalibus parvis, tenuiter longitudinaliter striatis, apertura elongata, pyriformi, labro tenuissimo, antice producto, labio inconspicuo, plica crassiuscula. Upper Yarra, Victoria. W. Kershaw.*

Shell subumbilicate, thin, diaphanous, pale, horny, shining, spire acute, whorls four, convex, sloping, two spiral, one small; finely striate lengthwise, aperture elongate, pyriform, labrum very thin produced anteriorly, lip inconspicuous, plait a little thickened.

A shell with no very determinate characters, of small size and thin.

*PHYSA KERSHAWI, n.s. P. t. parva, anguste ovata tenui, periostraca sordida, rugosa, induta, parum diaphana, sordide fusca; anfr. 3½ ad 4, superne conspicue angulatis et planatis, ad angulum regulariter (et sup. ult. anfr. distanter) carinatis; carinis rotundatis, elevatis; ad suturas anguste canaliculatis, apertura ovali, antice producta; labro tenui, ad carinas sinuato, labio reflexo, subumbilicato. Long. 8, Lat. 4½. Upper Yarra. W. Kershaw.*

Shell small, narrowly ovate, clothed with a sordid rugose periostraca, slightly diaphanous, dusky in colour; whorls three and a half to four, conspicuously angulate and flattened above, at the angle (and on the last whorl distinctly) keeled, keels rounded, raised; at the suture narrowly canaliculate, aperture oval, produced anteriorly; labrum thin, sinuous at the keels, inner lip reflexed, subumbilicate.

There is a faint resemblance between this shell and the New Zealand *P. tabulata* of Gould.

BYTHINIA VICTORIÆ, n.s. *B. t.*, *minuta*, *turbinato-conoidea*, *viride lutea*, *sericea*, *periostraca atra plus minusve induta*; *anfr.* 4½-5, *rotundato-convexis*, *levibus*, *longitud. tenuiter rugoso striatis*; *apice obtuso*, *apertura ovata*, *intus castanea, vel alba*, *labro tenui*, *labio vix reflexo*.

A minute shell, whose size, silky appearance, fine longitudinal striæ, and turbinately conical form, distinguish it from all its Australian congeners. Lake Connemare, Geelong. Found in great numbers in *Confervæ* by W. Kershaw.

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ART. X.—On Various Forms of Galvanic Battery.

BY R. L. J. ELLERY, F.R.S., F.R.A.S.

[Read August 9th, 1877.]

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